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# DECISION ANALYSIS AND MEDICAL MALPRACTICE

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DECISION ANALYSIS AND MEDICAL MALPRACTICE

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## ABSTRACT

Normative decision theory has been applied to the problem of evaluating alternative diagnostic treatment strategies. The courts rely upon a different set of doctrine in performing the same sort of evaluation. This paper investigates the differences. It is suggested that the alleged "malpractice crisis" results largely from the application of a set of ambiguous and mutually inconsistent medico-legal principles such as "reasonable medical certainty," "standards of good medical practice in the community," and "proximate cause." The expected utility criterion of decision analysis is proposed as an alternative to this melange, both for the purposes of establishing the existence of negligence and for determining the proper amount of compensation.

## DECISION ANALYSIS AND MEDICAL MALPRACTICE

The present state of the law is, then, still one of troubled waters, in which anyone may fish.<sup>1</sup>

### 1. Introduction

#### 1.1 "A National Crisis"

Medical malpractice has recently attracted considerable attention. Both the number of malpractice claims and the average size of claims have risen sharply in response to a number of apparent factors -- more physician-patient encounters (both absolutely and per physician), the growth of the consumer advocate movement, an increased willingness of doctors to testify against other doctors, and shifts in the court application of legal principles. The National Observer observes: "In California, premiums have quadrupled in four years; some physicians must pay as much as \$15,000 annually. The highest rate reported in testimony here (at federal hearings in Cincinnati) was \$35,000 charged two highly specialized orthopedic surgeons in New York."<sup>2</sup> Aetna Life & Casualty reported a tripling in cost per claim from 1964 to 1969.<sup>3</sup>

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<sup>1</sup>[12], p. 296.

<sup>2</sup>[2 ].

<sup>3</sup>[21], p. 8.

In this era of national crises, Senator Abraham Ribicoff's Subcommittee on Executive Reorganization concluded, in a 1,060-page report on malpractice: "The situation threatens to become a national crisis."<sup>4</sup> Even Ann Landers is devoting entire columns to the malpractice problem.<sup>5</sup> As is customary in time of national crisis, a federal commission on Medical Malpractice was recently established to look into the matter.

## 1.2 "Defensive Medicine"

Much has been said to suggest that the courts are not doing a good job. The senior editor of The Washington Post Potomac magazine writes: "The best doctors tend to get sued most often."<sup>6</sup> And a prestigious physician in California asserts that medical malpractice cases in his state "have struck good doctors as often as, or even more often than, bad ones."<sup>7</sup>

A related claim that suggests the courts could do better is even more common: "(As a result of malpractice trends,) the entire profession leans more and more towards the practice of 'defensive medicine,'"<sup>8</sup> which has been defined as "poor practice

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<sup>4</sup>[21], p. 1.

<sup>5</sup>[9].

<sup>6</sup>[4], p. 10.

<sup>7</sup>[20], p. 12.

<sup>8</sup>[4], p. 8.

induced by a threat of liability."<sup>9</sup> This is amplified in the National Observer: "We see a proliferation of tests, X rays, hospitalization, and consultations whose chief purpose is defense against a possible charge of negligence."<sup>10</sup>

Whether or not the situation is reaching "crisis" proportions, the increasing frequency and magnitude of claims, together with the controversy over the effects of the court decisions upon medical practice, suggest that a critical review of the criteria the courts use to adjudicate medical malpractice is in order.

### 1.3 Goals of Malpractice

Before we review the legal aspects of medical malpractice, it is in order to consider the goals of a malpractice system, irrespective of whether that system is administered within a legal or non-legal (e.g., arbitration) framework. I propose the following objectives:

- 1) Protect physicians who serve their patients with treatment that is appropriate for each patient's unique set of presenting symptoms and desires.
- 2) Protect patients from doctors who violate an obligation to treat in an appropriate manner a patient with a particular set of presenting symptoms and desires.

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<sup>9</sup>[8], p. 72.

<sup>10</sup>[2], p. 15.

3) Establish a compensation system that provides both just relief to injured patients and adequate disincentive for doctors to violate obligations to patients.

4) Establish a system that is efficient.

## 2. Legal Aspects of Medical Malpractice

Medical malpractice is a branch of tort law. Because of this, liability for fault and compensation for harm are central concepts that underlie malpractice litigation.

A first general rule governing the law of malpractice was offered by Judge Lockwood (in *Boyce v. Brown*, 51 Ariz. 416, 77 P.2d 455):

One licensed to practice medicine is presumed to possess the degree of skill and learning which is possessed by the average member of the medical profession in good standing in the community in which he practices, and to apply that skill and learning, with ordinary and reasonable care, to cases which come to him for treatment. If he does not possess the requisite skill and learning, or if he does not apply it, he is guilty of malpractice.<sup>11</sup>

Now, we cannot expect every physician to possess the "average" degree of skill and learning; and we should be prepared to believe that an entire community of doctors can practice negligently;

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<sup>11</sup>[17], p. 203.



moreover, to define malpractice in terms of "reasonable" care, seems to beg the question--however, this is only a very general rule which has some value for setting the stage and for exposing the uninitiated to the language of the courts.

## 2.1 Negligence

Negligence is the dominant charge that arises in malpractice suits. Senator Ribicoff reports that about 85% of all malpractice cases allege the presence of negligence.<sup>12</sup> The courts hold that negligence on the part of a physician must be proven, and does not arise merely from the fact that the particular course of action taken by the physician failed to bring about a desirable outcome. If it were otherwise, according to Mr. Chief Justice Taft (in *Ewing v. Goode*, C.C., 78 F. 442, 443), "(f)ew would be courageous enough to practice the healing art."<sup>13</sup>

Sagall and Reed identify four elements that a plaintiff must demonstrate were present in order to prove the existence of negligent medical practice: 1) that the physician incurred a duty to conform to a particular standard of conduct; 2) that he was derelict and breached that duty; 3) that the plaintiff suffered damage as a result; and 4) that the physician's conduct was the direct or proximate cause of the damage.<sup>14</sup>

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<sup>12</sup>[21], p. 5.

<sup>13</sup>[17], pp. 279-280.

<sup>14</sup>[15], pp. 2-3, 117.

Negligent medical practice "must be established by expert medical testimony, unless the negligence is so grossly apparent that a layman would have no difficulty in recognizing it,"<sup>15</sup> in which case the principle of res ipsa loquitur (i.e., "the thing speaks for itself") is said to hold.<sup>16</sup>

## 2.2 Proximate Cause

In many malpractice cases in which negligence is charged, the courts attempt to assess the nature of the relationship between what the doctor did or did not do and the unpleasant outcome that the patient incurred. Recognizing that a causal link cannot be proven absolutely, the courts have come to rely often upon the doctrine of "proximate cause". According to Prosser,

the word 'proximate' is a legacy of Lord Chancellor Bacon, who in his time committed other sins. The<sup>17</sup> word means nothing more than near or immediate...

Proximate cause is typically applied in cases where harm comes to a person by an apparent combination of events, and in such cases the courts are left to establish the nature of the involvement of the defendant. The question of negligence in these cases will generally depend upon the "foreseeability" of an unpleasant result and, in view of that, the "reasonableness" of the defendant's action.<sup>18</sup>

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<sup>15</sup>[17], p. 204.

<sup>16</sup>Prosser [12], p. 167, asserts: "in the great majority of malpractice cases...there can be no finding of negligence in the absence of expert testimony to support it."

<sup>17</sup>[12], p. 282.

<sup>18</sup>[12], p. 330.

A large body of legal thinking holds that proximate cause is too ubiquitous a concept to have sufficient operational value for the courts. According to one spokesman from this school:

Having no integrated meaning of its own, its chameleon quality permits it to be substituted for any one of the elements of a negligence case when the decision on that element becomes difficult...No other formula...so nearly does the work of Aladdin's lamp.<sup>19</sup>

In spite of this, the concept is frequently applied in malpractice cases. This generally boils down to the question: To what extent did a particular untoward outcome, such as death or paralysis, result from the particular action taken (or from failure to take action) by the physician? One attempt has even been made to construct a normative model to adjudicate malpractice contests based upon a quantification of the proximate cause doctrine.<sup>20</sup>

We shall take the position later that the concept of proximate cause provides neither a useful nor just standard to determine whether negligence was present in a malpractice contest.

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<sup>19</sup>Green, "Proximate Cause in Texas Negligence Law," 1950, 28 Texas Law Review, 471; as cited in [12], p. 284.

<sup>20</sup>[3]. Bush et. al. recommend in this paper that compensation be based upon expert assessments of the probability that a particular unpleasant outcome was caused by the medical treatment in question.

### 2.3. Informed Consent

Perhaps the most unusual aspect of the physician-patient relationship is that it so often involves a substantial transaction that is made in the absence of a written contract. Because of this, the courts have recognized the existence of an implicit contract between doctor and patient. The essential nature of this contract has been described by Stetler and Moritz as follows:

When a patient presents himself to a physician for medical care and the physician proceeds to render that care, the law implies that a contract has arisen between the parties. It is from this contractual relationship that the duty of a physician to his patient arises.<sup>21</sup>

Unfortunately, implicit contracts are, by their very essence, vague. This vagueness appears to create especially difficult problems in the area of consent. If the contract were explicit, the responsibilities of the respective parties would be made clear. It seems safe to speculate that some such contracts would specify that the physician will take no action whatever without the fully informed consent of the patient or duly named agent; at the other extreme, some patients would be willing to enter contracts that give the physician absolute authority to do whatever he decides is best for the patient. Since the contract is hardly ever made explicit,

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<sup>21</sup>C. Joseph Stetler and Alan R. Moritz, Doctor and Patient and the Law, 1962, p. 306; as cited in [10], p. 82.

the courts find themselves having to decide, in about 10% of all malpractice cases,<sup>22</sup> whether a patient was allowed sufficient opportunity to express his preference in the medical decision made in his own behalf.

During the 1960's, the courts shifted from a doctrine of simple consent toward one of informed consent.<sup>23</sup> A landmark 1957 case appears to have been largely responsible for this shift. The language of this case is instructive:

...a physician violates his duty to his patient and subjects himself to liability if he withholds any facts which are necessary to form the basis of an intelligent consent by the patient to the proposed treatment. Likewise the physician may not minimize the known dangers of a procedure or operation in order to induce his patient's consent. At the same time, the physician must place the welfare of his patient above all else and this very fact places him in a position in which he sometimes must choose between two alternative courses of action. One is to explain to the patient every risk attendant upon any surgical procedure or operation, no matter how remote; this may well result in alarming a patient who is already unduly apprehensive and who may as a result refuse to undertake surgery in which there is in fact minimal risk; it may also result in actually increasing the risks by reason of the physiological results of the apprehension itself. The other is to recognize that each patient presents a separate problem, that the patient's mental and emotional condition is important and in certain cases may be crucial, and that in discussing the element of risk a certain amount of discretion must be employed consistent with the full disclosure of facts necessary to an informed consent...<sup>24</sup>

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<sup>22</sup>[21], p. 5.

<sup>23</sup>[11], p. 1399; [21], p. 458.

<sup>24</sup>Salgo vs. Leland Stanford, Jr., University Board of Trustees, 154 Cal. App. 2d 560, 578, 317 P.2d 170, 181; cited in [21], p. 458, in [15], p. 136, and in [11], p. 1399.

Michael Justin Myers, in a survey of the doctrine of informed consent in the law, observes that the courts decide whether a doctor violates his duty to disclose facts using variously, the standards of "custom and practice of physicians within a community," "what a reasonable doctor would disclose under the circumstances," and the disclosure that is determined by "good medical practice."<sup>25</sup> Myers proposes to replace these nebulous standards with one that would obligate the physician to either fully disclose "all known material risks in a proposed... treatment except for those risks of which the patient is likely to know" or "prove the reasonableness of any lesser disclosure or the immateriality of the undisclosed risk."<sup>26</sup> He remarks that this proposed standard would shift the burden of proof of insufficient disclosure from the patient to the physician, that such a shift would increase the disclosure of risks, and that this "would better meet the needs of the patient and society."<sup>27</sup>

The chief problem posed by the informed consent issue seems to be that the extent of disclosure that is appropriate in a particular instance is often a difficult question of judgment. To

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<sup>25</sup> [11], p. 1402.

<sup>26</sup> [11], p. 1407.

<sup>27</sup> [11]. pp. 1410, 1414, 1418.

borrow from Sagall and Reed, "the physician often finds himself treading a legal tightrope in trying to keep the welfare of his patient paramount."<sup>28</sup> It appears that Myers' proposal could do little more than to shift the placement of the tightrope without lessening the difficulty of walking it.

In Section 3 we discuss a proposal that, among other things, attempts to ease the physician's burden in this matter by incorporating the patient's preferences without having to inform the patient of the risks he faces.

#### 2.4 Reasonable Medical Certainty

For reasons that will be clarified in the next section, it is essential to distinguish between information about a patient's preferences and information about his symptoms. The informed consent doctrine sets forth a means whereby the courts encourage that the patient's preferences enter the decision making process, and the proximate cause doctrine attempts to establish a link between medical symptoms and outcomes, irrespective of preferences. Another doctrine used is the law to relate symptoms to outcomes is that of "reasonable medical certainty" or "reasonable medical probability".

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<sup>28</sup>[15], p. 135.

In the words of a distinguished trial lawyer,

Reasonable medical certainty for trial is an opinion permitted by the court which is based on scientific knowledge and professional experience. Once this test is met and the court recognizes the status of the witness as having expert qualifications which will assist the jury in arriving at a better understanding of the medical issues, it is perfectly proper for the doctor to testify firmly as to his opinion.<sup>29</sup>

The author of this statement explains that this doctrine is an exception the courts make to the rule that only hard facts are admissible as evidence; in most non-medical cases, the judge rules out of order any testimony that is stated as opinion rather than fact, in order to shield the jury from prejudicial evidence. Empirical evidence about a class of patients with the particular combination of symptoms like those of a plaintiff in a given malpractice suit is sufficiently rare to justify such use of expert medical opinion in most cases.

There is an additional crucial element of reasonable medical certainty or probability that the courts have established--namely, that in the expert's opinion, the causal link must be greater than 50%. According to Sagall and Reed,

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<sup>29</sup>[16], p. 26.



...absolute or positive proof of causality is not required. It is sufficient to show that causality was 'probable,' that is, was more likely to have occurred than not... It is only necessary to show that the adverse result more likely than not was caused by the defendant's negligent conduct.<sup>30</sup>

Shepherd puts it another way:

If in the exercise of the trial judge's discretion it reasonably appears to him that the expert, in giving testimony supporting a particular causal relation, is addressing himself to reasonable probabilities according to scientific knowledge and experience, and the testimony per se does not show that the causal relation is merely speculative and a mere possibility, the admission of the testimony will not be held erroneous.<sup>31</sup>

The use of this aspect of the reasonable medical certainty criterion in medical malpractice is questionable for at least two reasons: First, it attends only to the probability side, ignoring the "utility" or value side. Whether a particular probability is .50 or .51 is not likely to be important to a decision maker when he has strong preferences for certain outcomes relative to others in the payoff matrix he faces. Why, then, should the courts focus exclusively on whether a probability falls on this side or that of an arbitrary line?

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<sup>30</sup>[15], pp. 107, 122-123.

<sup>31</sup>[16], p. 26.

Second, the criterion appears to ignore alternative treatments. It seems more pertinent to establish whether the treatment administered is preferable to an alternative treatment, on the basis of all the relevant probabilities and utilities. As it stands, one might infer that the criterion compares the treatment administered with the alternative of no treatment at all, but this is not clear. There are typically strategies other than "the one administered" and "no treatment at all" that the courts ought to weigh in determining whether the physician violated an obligation to his patient.

### 3. Medical Decision Analysis

The courts do not set forth the only basis with which to objectively evaluate a medical treatment. Another yardstick is offered in a body of literature that we shall refer to as medical decision analysis. The methodology that underlies this work has been applied fruitfully to the standard sore throat problem, acute renal failure, severe abdominal pain, and the pleural effusion problem, to name a few.<sup>32</sup> In each of these applications, decision trees, probabilities, and outcome estimates are elicited from medical experts and combined with values that reflect patient

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<sup>32</sup>[14, 1, 5, 7].

preferences, in a logically structured attempt to evaluate alternative strategies of diagnosis and treatment.

### 3.1 Foundations of Medical Decision Analysis

In its barest essentials, the model requires, first, that every possible outcome be transformed to a single index that summarizes the decision maker's relative displeasure or "disutility" for that outcome; then, the best available medical judgment is brought to bear to determine the probability of occurrence of each possible outcome, conditional both upon the presenting symptoms and upon each diagnosis-treatment strategy under consideration; next, the expected disutility is computed for each strategy in accordance with the standard formula for calculating a mathematical expectation; finally, whichever strategy has the smallest expected disutility is deemed optimal.

Anyone who is not certain he wants to rely upon this criterion to evaluate each of two or more clinical strategies can deductively overcome his reluctance by agreeing to four fairly innocuous axioms:

- 1) As between any two outcomes, say A and B, you should be able to establish unambiguously that you prefer A to B, that you prefer B to A, or that you are indifferent between A and B.

2) If you prefer A to B and B to C, then you ought to prefer A to C.

3) If you prefer A to B and B to C, then you should be able to pin down a probability,  $p$  (a number between zero and one), such that for all A, B, and C, you are indifferent between the option of having B occur for certain versus the option of employing a strategy in which the chance of A occurring is  $p$  and the chance of C occurring is  $(1-p)$ .

4) If you alter a strategy by substituting for one of its possible outcomes (which can itself be a strategy) another outcome, and leave the remainder of the strategy unchanged, and if you are indifferent between the original outcome and its substitute, then you ought to be indifferent between the original strategy and altered one.

If you choose to live under these axioms, then we can define for you a disutility function,  $DU( )$ , that assigns an index number to each outcome, and which has the property that if you prefer outcome A to outcome B, then  $DU(B) > DU(A)$ .<sup>33</sup> Moreover, the

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<sup>33</sup> It is customary to define a utility function,  $U( )$ , rather than its inverse function, as has been done here. This custom has been broken because the attributes of the utility function in the medical setting--death, incapacity, financial costs, pain, contagion, and so on--are all "bads" rather than "goods." The rule of minimizing expected disutility, which we use here, is equivalent to that of maximizing expected utility.

disutility of any strategy will, for you, be equivalent to the expected disutility of the outcomes that comprise the strategy. We can, then, evaluate alternative strategies of diagnosis and treatment, given any particular set of symptoms and preferences, by comparing their expected disutilities.

### 3.2 Prospective Role in Medical Malpractice

If decision analysis provides a valid basis for evaluating a set of alternative diagnosis-treatment options before the decision, then it should be equally valid after the decision, given the same set of presenting symptoms and preferences. That the two are equally valid, however, does not imply that they are equally useful. Indeed, medical decision analysis may be no less useful after the decision than beforehand. Of course, doing the analysis afterwards will be of little immediate value to the patient who has already received treatment A instead of treatment B; but there is often no time to formally lay out decision trees, estimate conditional probabilities, and so on, for a patient who is desperate for an immediate decision by a physician. Moreover, analysis after the decision may be useful for establishing whether negligence was present, for determining the

proper amount of compensation for that person as plaintiff if negligence is found to be present, and for establishing the best strategy for any future patients with the same characteristics.

### 3.2.1 Establishing the Existence of Negligence

In particular, it seems reasonable to assert, once we come to terms on the probabilities and disutilities, that expected disutility is a useful standard for a courtroom assessment of whether the treatment actually administered is inferior to one that a plaintiff's attorney alleges would have been superior. In the absence of pressing circumstances that require expedient rather than optimal action on the part of the physician, it would seem appropriate to allege the existence of negligence whenever both of two conditions are present: (1) the patient received a treatment whose expected disutility, conditioned upon the presenting symptoms and patient preferences, exceeds that of another feasible treatment; and (2) the disutility of the outcome incurred by the patient exceeds the expected disutility of the optimal treatment.

The skeptic<sup>34</sup> who does not accept the expected disutility criterion should state which of the four axioms cited in section 3.1

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<sup>34</sup>The pejorative connotation of this word is not intended.

he thinks a patient should reject, and explain a reasonable rationale for rejection. Alternatively, a skeptic might accept this criterion and then argue either that we are not likely to come to terms on the probabilities and disutilities, that we might not expect a reasonable physician to always select the very best course of action in the press of an emergency, or both. These two positions will be taken up in turn.

#### 3.2.1.1 Resolution of Probabilities and Disutilities

In attempting to show that the plaintiff received a treatment with expected disutility greater than that of an alleged superior treatment, the plaintiff's counsel may produce evidence on pertinent probabilities and disutilities that disagrees with evidence set forth by the opposing attorney. The evidence on probabilities could take the form of published or otherwise recorded relative frequencies, or testimony by expert witnesses. The correctness of such evidence is question of fact, which juries are entrusted to decide after hearing both sides. We presume here that the best physicians are the ones who base their choice of treatment upon the most accurate conditional (i.e., conditional both upon each treatment alternative and upon the presenting symptom complex) probabilities.

The evidence on disutilities should reveal information both about the patient's willingness to incur risk in any of the variables that are pertinent to the patient's presenting symptoms and about his willingness to make trades among all these variables (i.e., marginal rates of substitution). This evidence could conceivably take any or all of several different forms: (1) The patient might have filled out a questionnaire informing the physician of levels of voluntary purchases he has made for medical and life insurance, auto safety equipment, along with information such as number of traffic violations, and so on. (2) The patient might have answered hypothetical questions designed explicitly to provide an assessment of his disutility function.<sup>35</sup> (3) The patient might have determined his disutility function himself or with the help of an agent and given the function to his physician (perhaps along with other pertinent information such as the name of his medical insurance carrier), as part of a written contract with the doctor to base medical treatment upon that function, taken together with the doctor's best estimate of the relevant conditional probabilities.

A special problem arises when the patient's presenting symptoms suggest outcomes which present "externalities"--i.e., effects

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<sup>35</sup> This methodology is described in [6] and [13].



upon the utility of third persons. Examples are contagious illnesses and insurance claims which cause the premiums of other insurance holders to rise. The theory of welfare economics tells us that in such cases the doctor might want to guide his decision using the appropriate "welfare function"--i.e., the function that aggregates the utility functions of all individuals affected. In practice, of course, we would not expect the physician to know this function;<sup>36</sup> hence, it would seem appropriate in most cases for the physician to dictate the equivalent amount of, say, duration of incapacity that he would impose upon the patient to eliminate or reduce by a given amount an external diseconomy such as contagion or third party medical payments. The courts might find later the physician's choice of the amount of disutility traded between the affected parties to be unjust either to the patient or to others, but at least the issue is made explicit in this framework.

#### 3.2.1.2 Urgency as an Extenuating Circumstance

In the case where the patient's condition is such that the physician has no time to push numbers around, the physician might very well select a treatment which turns out, upon analytic reflection, to be suboptimal. In many such instances, "reasonable men"

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<sup>36</sup> This is true partly because he is not likely to know the utility functions of all the third parties, and also because he would have difficulty in knowing how to properly aggregate them even if he knew them.

will agree that the physician behaved expeditiously and was not negligent, and in certain other cases they will agree that he blundered badly. While an explicit solution to this problem will not be presented here, we can say at least that the issue involves a trade between the disutility cost of analysis and the disutility cost of ignorance that results from failure to do the analysis. The meta-decision tree for each patient management problem contains the range of possible options as to how much analysis should precede the implementation of medical treatment, and in some cases this analysis would show that the optimal amount of analysis is none at all. But, clearly, in these cases where no analysis is appropriate, the physician is not immune from negligence.

We recognize here, along with the legal community, that physicians take on certain obligations to their patients, even in the absence of an explicit contract. One such obligation would seem to be that qualified physicians should anticipate certain common kinds of emergencies and should be prepared to deal with them. A related obligation would be that he should not commit the same serious error twice. Both of these suggest that the physician should structure his thinking on certain patient management decision problems involving urgency before they occur.

In these situations, establishing the existence of negligence ex post would appear to be a discretionary matter that, in each separate instance, will depend upon at least three factors: (1) the extent to which the expected disutility of the treatment administered exceeds the expected disutility of the treatment determined by the analysis to be optimal; (2) the amount of time the physician had to reflect before taking action; and (3) any peculiarities in the contract that existed between patient and physician.

### 3.2.2 Determining the Proper Amount of Compensation

Whenever negligence is found, it remains for the courts to establish the amount of settlement that is in some sense just. Having no special ordainment in the field of ethics, I shall say little about the just settlement. What we might agree upon, however, is an upper bound on the proper amount of compensation.

We safely assume both that compensation will be in the form of money and that money (i.e., wealth or increments or decrements to wealth) will be in the plaintiff's disutility function. We then assert that for any negligent treatment, the difference in expected disutility between the negligent treatment and the treatment demonstrated to be superior can be converted into a dollar

amount such that the plaintiff would have been indifferent between having the inferior treatment along with this dollar compensation versus having the superior treatment with no compensation. This will be the extreme upper limit.

We might reasonably lower this upper bound amount in the case where the disutility of the outcome incurred by the plaintiff who received an inferior treatment is less than the expected disutility of that treatment--that is, in the case where the patient received an inferior treatment, but was lucky in that the outcome he experienced was not as dire for him as the average outcome that would have been experienced by a very large number of patients who presented his symptoms and received the treatment he received. In this case we might choose to compensate him with an amount no larger than the amount of money such that he would have been indifferent between the outcome he actually received plus that amount of money versus having the superior treatment without any money,

#### 4. Conclusion

I am one of a group of individuals who would be willing to pay a premium to a knowledgeable physician who agrees to administer medical treatment to me on the basis of an explicit

statement of my preferences and his best assessment of the medical probabilities that are pertinent to the symptoms I present. In particular, I am fond of minimizing my expected disutility when my symptoms suggest two or more diagnosis-treatment options. Hence, I am interested in what the courts are doing to influence physician behavior so as to alter the actual market price of this premium. I observe that the price of the premium I must pay to enter such a contract remains high as long as the courts rely upon such doctrine as proximate cause, community standards, and reasonable medical certainty.

To put it another way, medical decision analysis, whose growth is unmistakable and whose foundation is rigorous, could conceivably be used to determine the optimal course of patient management for a patient with a given set of symptoms and preferences, and the courts could then determine that the treatment so prescribed was "unreasonable," or, "inconsistent with the standard of good medical practice in that community," or that the physician's action was the "proximate cause" of the unpleasant outcome experienced by the patient.

It ought to be obvious that the several tenets that are employed in malpractice litigation are not even compatible among

themselves. Thus, for example, a particular medical decision might well be inconsistent with the community standards of good practice, while at the same time that decision was the only one to which the patient would give informed consent. Examples of this sort of conflict among legal principles abound in law casebooks. And while some will deride consistency as an objective, the presence of inconsistency in the law can make life miserable for the physician who wishes to avoid being sued for malpractice.

It has been suggested that there are "inherent limitations in the linking of mathematics to procedural rulemaking" in the courts.<sup>37</sup> While this is unquestionably true, I find the criterion set forth in this paper to be less ambiguous, less cumbersome and, in general, more consistent with the goals set forth in Section 1.3 than is the case with the grab-bag of legal tenets from which the courts presently evaluate a physician's treatment.

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<sup>37</sup>[18], p. 1393.

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